

Exhibit 4

Operations Plan

General Operations Plan

Processing of Asphalt Shingles at the R&M Recycling, LLC Facility

R&M Recycling, LLC

924 Heald Street

Wilmington, DE 198014

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General Operations Plan

1.0 Facility Overview

1.1 Purpose and Regulatory Overview

This General Operations Plan ("GOP") details the procedures and operating practices that are employed at the R&M Recycling, LLC. (R&M) asphalt shingles recycling center related to the acceptance and processing of asphalt shingles to produce recycled ground asphalt feed stock for hot/cold mix plants or as road subbase material. The information presented here is intended to comply with the requirements contained in the *Delaware Regulations Governing Solid Waste ("DRGSW")* for recycling facilities. The R&M facility is located at 924 Health Street, Wilmington, New Castle County, Delaware. The site is east of Heald Street (US 13) and west of New Castle Avenue (SR 9) in New Castle County, Delaware. The site is surrounded by other heavy industrial uses and activities to the North, West, and South, while a residential area is located to the east of the site. R&M's asphalt recycling operation will be located on a portion of the property as depicted in the site location map included in Attachment I. This portion of the site is approximately 1.1 acres and 283 feet by 161 feet. A site plan of the asphalt shingle recycling area is also provided in Attachment I (Figure 1).

This GOP provides detailed information on the operations of the asphalt shingle facility including; material acceptance, marketing, site access, waste analysis, maintenance, inspections and other related information. The GOP has been developed to ensure that all operations conducted are in compliance with all applicable Federal, State and Local laws and regulations pertaining to recycling facilities. Specifically, this new facility will conduct its recycling operations pursuant to Section 2.5.2 of Regulation 1301 of DRGSW.

1.2 General Overview of Operations

The asphalt shingles processing facility will receive both pre-consumer and post-consumer shingles. Pre-consumer shingles are off-specification shingles from outside manufacturer sources. These are shingles that have not been previously used as roofing cover or roofing material for residential or commercial buildings and structures. Post-consumer shingles are shingles that have previously been used as roofing cover material that result from roof repairs, removals or residential/commercial demolition operations. These post-consumer shingles may be received from construction/demolition contractors, roofers, recycling/collection centers and/or home owners.

The shingles received will be ground and processed at the facility into asphalt feedstock materials that can be processed by asphalt hot or cold mix plants or be resold to be used as pavement for highways and roadways. This process will ultimately divert these shingles from being disposed of in a landfill. The R&M Asphalt Shingles Processing Facility is designed to recycle approximately 90,000 tons of asphalt shingles per year into reusable material.

1.3 Property Description

The R&M Asphalt Shingles Processing Facility will be located at 924 Heald Street, Wilmington, DE 19801. As stated above, the facility is located on a 1.1 acre portion of the property which is zoned for heavy industrial uses and is surrounded by a variety of industrial users, including a scrap metal processing facility and an aggregate storage and processing plant. The site is east of Heald Street (US 13) and west of New Castle Avenue (SR 9) in New Castle County. R&M formerly operated at 1610-1620 Bowers Street, Wilmington, Delaware, 19802.

A Site Plan and Aerial Map of the site are provided as Attachment I to this Operations Plan.

The coordinates of the facility are:

Latitude: 39 degrees 43 minutes 20 seconds N

"

Longitude: -75 degrees 32 minutes 47 seconds W

1.4 Approvals, Licenses, Permits and Zoning

R&M is located in an HI – Heavy Industrial Zone. A copy of the New Castle County Official Zoning Map, Map No. 37, is included in Exhibit 3 of the application.

The operations rely on the use of a horizontal grinder unit that is operated at the site to process incoming shingles to produce the recycled asphalt product. A grinder will be brought to the site on an as needed basis either by R&M Recycling or another permitted contractor. Any grinder brought to the site to process shingles must be properly permitted. No operation of a grinder unit will be allowed to commence until the appropriate air permits are approved by the Department.

1.5 Facility Services and Marketplace Overview

1.5.1 Asphalt Shingles

The facility provides a benefit to the community as an alternative to landfill disposal of asphalt shingles. The asphalt shingles will be ground and processed into a raw material that can be used as pavement or subbase material for highways and roadways or as asphalt hot/cold mix plant feedstock.

The processing equipment used to prepare the recycled shingles will have appropriate controls to minimize dusts (e.g., water spray systems) during operations. The site where the operations will be conducted has a paved surface and will have appropriate controls to minimize potential environmental impacts from the operations.

The facility has the ability to process approximately 90,000 tons per year of these asphalt shingles. The majority of these shingles will come from the regional area surrounding the City of Wilmington and New Castle County, Delaware. Other outlying areas of Delaware or southern Pennsylvania may utilize the facility depending on transportation costs. In addition to the shingles, R&M will maximize the recycling and reuse of any other industrial materials that may be received with the shingles, such as steel, wood and aluminum.

1.5.2 End Market Uses

End market strategies for the R&M processed asphalt shingles include asphalt manufacturing plants/suppliers, private paving companies, public works departments,

and State or Federal Departments of Transportation. The processed shingles, once separated from any metal or wood material, makes an excellent feedstock product for asphalt plants. Private paving companies will create a large market for this after-market good which will enable them to make pavement for use in multiple small scale paving projects. Public works departments may require this material in order to repair areas of roadway and parks in neighboring communities. State and Federal Departments of Transportations may use this product in order to initiate and complete large scale highway paving projects. With increased Federal spending on infrastructure project as a means to create work projects this market should provide a large outlet for R&M to resell their materials.

2.0 Site Environmental Setting

2.1 Site Location

The site is located at 924 Heald Street, in Wilmington, Delaware. The site is east of Heald Street (US 13) and west of New Castle Avenue (SR 9) in New Castle County. An aerial map of the site is provided in Attachment I of this plan.

The area dedicated to the asphalt shingles operation occupies approximately 1.1 acres and is approximately 283 feet by 161 feet. The R&M facility is accessed by a common entrance driveway, located on New Castle Avenue. The site includes a security fence and barriers to limit access to the property.

2.2 Surrounding Land Use and Topography

The site is located in a Heavy Industrial – HI Heavy Industrial zoning district. This zoning district is used principally for industrial developments.

The asphalt shingle processing operation is located on an existing industrial site, currently operating as a recycling facility by Diamond Materials. Industrial operations border the facility to the west and south, while a commercial operation lies to the north of the site. A residential neighborhood is located 100 feet east of the facility. A city recreational facility, Eden Park, is located 800 feet northeast of the facility. Existing operations at the site include recycling of aggregate materials, thus no new impact to surrounding areas is expected. The topography of the site is generally flat with a slight slope towards the southwest.

2.3 Water Sources

2.3.1 Onsite Water Supplies

The site is served by utilities from the City of Wilmington, Delaware, however there is no potable water and sanitary sewer at the site. There is no onsite potable water well. A water truck will be available at the site to supply portable water for dust suppression for the grinding equipment, storage piles and roadways.

2.5 Wetlands

There are no designed freshwater wetlands on the property where the facility is located. No onsite operations will be conducted in freshwater wetlands or protected zones.

2.6 Nuisance Dusts, Odors, and Litter

2.6.1 Dust Management Plan

R&M will employ various methods to control the generation of fugitive dust from the site operations. Any dust created from the handling or processing of the asphalt shingles will be controlled through using appropriate water spray systems affixed or associated with the facility's processing equipment. R&M has access to adequate water supplies and appropriate equipment to allow site personnel to wet down the piles of unprocessed and processed shingle materials stored onsite as needed. This measure will be employed on an as needed basis to minimize the amount of dust that could blow off the piles when seasonal conditions warrant. Stockpiles of processed and unprocessed shingle materials will be kept to a manageable height.

The onsite traffic patterns used by vehicles accessing the facility are intended to minimize vehicle roadway traffic in areas where products are stored or processed. In addition, the site is readily accessed by a number of major roadways to allow offsite vehicular traffic to avoid residential areas. Vehicles that utilize this site are not expected to use local residential area roadways, except when projects are generated from residential roof repair/development. The use of any roads in residential areas will be kept to a minimum. Trucks delivering materials or leaving the property with processed shingle materials will be covered with a tarp, or other suitable cover, to ensure that dust and debris will not blow off during transportation on roadways offsite.

The access roads to the site are paved. These roads may be cleaned or wetted as needed to minimize the amount of dust generated by trucks entering and exiting the facility. The site operator has access to adequate water supplies and appropriate equipment to allow the site personnel to wet down the piles of processed and unprocessed materials stored onsite. This measure can be employed to minimize the amount of dust that could blow off the piles when conditions warrant.

Due to the size and physical characteristics of the unprocessed material, it is anticipated the amount of the fugitive dusts generated from these stockpiles will be minimal. Prior to processing in the grinder, the material will be wetted with water to minimize the generation of dust during processing.

Stockpiles of processed materials will be wetted at the end of each day following the initial processing (unless weather conditions such as rain or snow provide a natural covering) to ensure that the outer layer of material is sufficiently wet to form an encrustation barrier over the stockpiles to limit potential fugitive dust. Additional wetting will be conducted during the course of the day if the facility believes that conditions exist where fugitive dusts emissions are potential.

2.6.2 Odor Control

This asphalt shingle processing operation is not expected to create odors that would be a nuisance to surrounding properties. Should R&M discover that these operations are creating an odor problem, they will re-evaluate odor control practices and implement a plan that minimizes the issue. Asphalt shingles are not putrescible wastes and not expected to generate odors. All operations are at ambient temperatures.

2.6.3 Litter Control

Good housekeeping practices throughout the site will keep litter to a minimum. Any litter will be immediately collected and placed in covered containers for ultimate disposal offsite at an approved disposal facility.

2.7 Health and Safety

The site operations will be conducted in accordance with appropriate industry recognized health and safety practices as well as R&M's current policies and procedures. Additional details regarding required training and safety procedures are detailed in Section 7.0 of this General Operations Plan.

3.0 Facility Process Description

3.1 Facility Layout and Design

The processed recycling facility is comprised of the following basic operating areas:

- The Unprocessed Material Storage Area, which is further segregated into an area for pre-consumers shingles (i.e., discards, cut-offs, etc.) and post-consumer shingles (i.e., used shingles from roof repairs/replacements, demolition activities, etc.);
- The Processing Area for sorting and/or grinding operations; and
- The Processed Material Storage Area, where finished products are staged prior to being sent offsite for reuse (the facility may use movable Jersey barriers to segregate the processed shingles area further to allow for the storage of processed materials from only pre-consumer shingles to meet the end use specifications, such as DelDOT requirements).

A site plan layout depicting these designated operating areas is included in this Plan as Attachment I. The Unprocessed Material Storage Areas is comprised of (approximately 195 feet by 60 feet) and is designed to hold approximately 8,000 tons (or approximately 16,000 cubic yards) of unprocessed shingles. Storage piles in this Area will be limited to a maximum height of 20 feet. This Area may also be used to store processed shingles to allow the facility to respond to changing end market conditions, particularly in winter months when asphalt plant production is reduced or interrupted. This Storage Area includes movable barrier walls (e.g., jersey barriers) used to segregate pre-consumer shingles from post-consumer shingles received by the facility. As materials are received, vehicles are directed to deposit their loads into the separate piles depending on whether they contain used (post-consumer) or unused (pre-consumer) shingles. For post-consumer shipments, R&M may segregate the incoming shingles into small receiving batches that will be stockpiled for subsequent sampling and analysis for asbestos testing by the facility, when appropriate (see Section 4.0 below).

The unprocessed post-consumer shingles are transferred to the facility's Processing Area, following confirmation that the shingles do not contain asbestos, where the shingles are hand-picked and sorted to remove any wood, metal or other non-processable materials that may be mixed with the shingles. The various non-shingle materials collected are stockpiled or placed into dumpsters for transfer to an appropriate offsite recycling/recovery or disposal facility.

Following this sorting step, the shingles are further processed, along with any pre-consumer shingles that do not require pre-sorting using a horizontal grinder to generate the final usable ground asphalt product. Depending on the requirements of the end product, the pre-consumer shingles may be processed separately to make a single post-processed material that is composed of only pre-consumer shingles (e.g., to meet a DelDot specification). Frequently, portions of the shingles may have to be re-processed through the grinder to ensure that the re-sizing of the material meets the reuse criteria.

Following processing, the ground shingles are stockpiled and placed in the Processed Material Storage Area (in piles no more than 20 feet high) at the facility until they can be sent offsite for reuse. The Processed Material Storage Area is located along the southern side of the facility. The area is approximately 87 feet long and 69 feet wide (as depicted in the facility Site Plan) and can store approximately 1,000 tons (approximately 1,500 cubic yards) of processed shingles. Again, this Processed Material Storage Area may be segregated using movable walls (e.g., Jersey barriers), that are used to separate end products that are comprised solely of processed pre-consumer shingles to meet an end use specification (e.g., a DelDOT standard). Processed shingles may also be stored in the unprocessed material storage as needed to adjust to market conditions. However, unprocessed shingles will not be stored in the Processed Material Storage Area.

3.2 Site Access and Traffic Management

3.2.1 Operating Hours

The processing facility will be open for receipt of recyclable materials from 6:00AM to 7:00PM Monday through Saturday. These represent the Daily Business Hours (i.e., hours open to the public). The facility will be open to process and handle materials within the bounds of the facility from 5:00AM to 9:00PM Monday through Saturday. These represent the Daily Operating Hours. This facility will be closed Sundays and holidays.

3.2.2 Site Security

The site is secured from access by a chain link fence and physical barrier across the site. The entrance to the facility will be monitored by facility employees during Daily Business Hours and Daily Operating Hours.

3.2.3 Area Roadway and Truck Routing

Materials will principally be delivered to the site by truck using New Castle Avenue.

3.2.4 Interior Traffic Procedures

The entrance to the property is located along Heald Street. Signs will be posted as necessary to direct traffic to the facility location.

The facility entrance is approximately 100 feet from the entrance New Castle Avenue. This portion of driveway will provide adequate queuing for trucks delivering materials to the site. Trucks of varying size are expected to enter the facility throughout the day. Inbound trucks will be received at the facility and will be directed to unload in the Unprocessed Material Storage Area. Trucks entering the facility to pick up finished product will be directed to the Processed Material Storage Area. Trucks will enter and exit the site using the same access road.

3.3 Storage and Process Areas

3.3.1 Pre-Acceptance

Customers or contractors who wish to use the R&M facility for recycling of their own asphalt shingles must complete a Pre-Approval/Certification Form (See Attachment II) for each project that will be brought to the facility. For pre-consumer shingles, the supplier of the shingles, or his authorized representative, must certify that the shingles were not previously used in a consumer application, such as installed as roofing material, and that the shingles would not be classified as an Asbestos-Containing Waste Material ("ACWM") as defined by U.S. EPA under 40 CFR Part 61, Subpart M (National Emission Standard for Asbestos). Customers or contractors wishing to recycle post-consumer shingles must select one of two options provided on the Pre-Approval Form to demonstrate that the materials are not classified as ACWM. The pre-approval procedures are further specified in Section 4.0 below.

3.3.2 Receiving Unprocessed Shingles

Inbound shipments received at the facility are directed to the Unprocessed Material Storage Area for check-in and unloading. As outlined in Section 4.0 below, a Pre-Approval/Certification Form is completed and reviewed by R&M for each new customer/contractor project. Pre-Consumer shingles may be unloaded directly into the designated pre-consumer shingles section of the unprocessed material Storage Area for stockpiling before final processing. Post-Consumer shingles that have been tested prior to receipt may also be stockpiled directly in the designated post-consumer portion of the Unprocessed Material Storage Area. For post-consumer shingles that will be sampled by R&M for analysis, incoming shipments will be staged and stockpiled into 50 to 150 cubic yard piles in the post-consumer (used) shingles portion of the Unprocessed Material Storage Area to facilitate pre-acceptance sample collection as described in 4.2 below. Once these materials have been analyzed and confirmed as non-ACM shingles, the storage piles are consolidated as needed, however, pre-consumer shingles are not comingled with post-consumer shingles until just prior to processing (unless segregation to meet the end use specifications is required)

During unloading, the shipments will be visually inspected by R&M employees for any unacceptable materials as described in Section 4.3. Shipments of post-consumer shingles may also contain wood, nails, metal flashing, etc. that are associated with the removal/repair work that generated the shingles. The materials are removed during the pre-processing/sorting procedure as outline in 3.3.3 below.

3.3.3 Processing Areas

Post-Consumer shingles are pre-processed before being placed through the grinder. Post-Consumer shingles are moved from the Unprocessed Material Storage Area to the Processing Area where operators can separate the materials to remove any wood, metal or other non-processable materials that may be mixed with the shingles. The various non-shingle materials collected are stockpiled or placed dumpsters for transfer to an appropriate recycling/recovery or disposal facility.

Following this pre-processing step, the sorted shingles are either placed back into the Unprocessed Material Storage Area or loaded into the grinder unit for final processing. Both pre-consumer and post-consumer shingles can be comingled during processing to generate the finished product (unless segregation to meet the end use specifications is required).

When sufficient quantities are available for processing, the sorted (pre-processed) stockpiles of post-consumer shingles, along with unprocessed pre-consumer shingles from the Unprocessed Material Storage Area, will be transferred into the infeed conveyor of the horizontal grinder unit (see Section 3.3.4 below) using a front-end loader, skid steer (Bobcat), or similar equipment, for final processing. The infeed conveyor to the grinder is 20 feet long by 6 feet 8 inches wide and moves the shingles through the multi-stage grinding process using heavy duty conveyor belts. A water spray system will be used during the grinding process to suppress any dust created during processing as needed.

Any processed shingle materials that do not meet the sizing requirements specified by the end user will be reprocessed through the grinder. Any unprocessable materials segregated during processing will again be placed into the onsite dumpsters in the Pre-Processing Area for proper management offsite. The final ground shingle product will be stockpiled in the Processed Material Storage Area until the materials are shipped offsite for reuse. The Processed Material Storage Area may also be segregated, as needed, using movable walls (e.g., Jersey barriers) to separate processed materials comprised of only pre-consumer shingles to meet an end use requirement (e.g., to meet a DELDOT specification).

3.3.4 Equipment

Provided below is a list of the typical equipment that will be utilized at the asphalt shingle facility for site operations. The equipment specified here may be replaced or upgraded, as necessary, with similar or equivalent operation equipment to perform the functions required for the operations.

- Front-End Loader or skid steer(s) – equipment will be used to stockpile and move shingle materials throughout the facility.
- Horizontal Grinder – this equipment will be used periodically onsite for use to process the shingles. The unit can process up to 300 tons of

shingles an hour. A more detailed description of the grinder and specifications for the unit is provided in Attachment IV of this Operations Plan. Screening Equipment (Optional) – screens may be used for both pre-processing post-consumer shingles to remove non-processable materials and to screen and sort processed shingles to ensure that the material meets the end user specifications.

- Miscellaneous hand tools and equipment.
Equipment will be properly maintained and inspected as discussed in Section 5.0 below.

3.3.5 Processed Material Storage Area

Processed shingles will be stockpiled and staged in the Processed Material Storage Area. This storage location is approximately 150 feet long and 50 feet wide which runs along the south side of the facility and borders the operating area. Vehicles that are used to transport the processed shingle product offsite for reuse will access the facility using the main entranceway and stage near the stockpile where facility personnel can load the vehicle. This Storage Area has the capacity to store up to approximately 1,000 tons (or about 2,000 cubic yards) of processed shingle product. Storage piles with this Area will be limited to a maximum height of 20 feet. Since the reuse of the processed shingle product has some seasonal fluctuation in demand as asphalt plant feed stock and as roadway subbase material, the facility may also store processed shingles in the Unprocessed Material Storage Area as needed. This Area may also be segregated, as needed, using movable walls (e.g., Jersey barriers) to separate processed materials comprised of only pre-consumer shingles to meet end use requirement (e.g., to meet a DelDOT specification).

4.0 Procedures for Pre-Qualification and Acceptance of Asphalt Shingles

4.1 Pre-Qualification/Approval Procedures for Shingles

All asphalt shingle materials to be processed at the R&M Recycling Facilities are qualified through a pre-approval review process prior to acceptance at the facility. The source of the asphalt shingles will either be pre-consumer or post-consumer asphalt shingles. No shingles containing asbestos will be accepted for recycling.

R&M will require customers or contractors to complete a Pre-Approval/Certification Form (see example of the form in Attachment II) for each new shingle project. This Form, when completed, will provide R&M with specific information on the shingle material and the source that generated it. For customers with pre-consumer shingles, only the pre-consumer portion of the Pre-Approval/Certification Form needs to be completed with the supplier information and certification. Pre-consumer (unused) shingles include cut-offs, tabs, and/or off-specification shingles received directly from a manufacturer or supplier. These are shingles that have not been previously used as roofing cover or roofing material for residential or commercial buildings and structures.

Post-consumer shingles, or used shingles (from roof repairs and replacements, structural demolition projects, etc.) may include incidental quantities of related roofing materials, including wood and woods products, roofing paper, nails, flashing and other metal materials. R&M will not accept Asbestos-Containing Material (ACM), fiber glass and other insulation materials, liquid materials (e.g., paints, oils, roofing tars, etc.), floor tiles, siding or other C&D materials not related to roof repair and/or replacement or related demolition activities. The customer or contractor that intends to bring post-consumer shingles to the facility must complete the bottom portion of the Pre-Acceptance Application Form, including the applicable certification for each new shingle project. Post-consumer shingles must also have appropriate documentation that shows the shingles are not ACM. There are two options that may be used to make this demonstration:

Option 1: Sampling and Analysis is completed by the Supplier

The supplier will sample and analyze the shingles prior to delivery to R&M using the procedures described in the facility's Sampling and Analysis Information Sheet ("SAIS") Form, included in Attachment II. The SAIS Form outlines the sample collection, testing frequency and laboratory requirements to properly complete the sampling. The supplier will then include the laboratory results with the Pre-Approval/Certification Form that is submitted to R&M for review.

Option 2: Sampling and Analysis is completed by R&M

R&M will sample and test incoming shipments of post-consumer shingles that arrive at its site for asbestos prior to acceptance (see Section 4.2 below). The supplier must still complete the Pre-Approval/Certification Form prior to R&M's acceptance of the material, however, R&M will issue a conditional approval number to the supplier/source indicating that final acceptance of the shingles is contingent upon the results of R&M's pre-acceptance sampling. The material will then be segregated and stockpiled in the Unprocessed Material Storage Area for testing as described below.

If the material is deemed acceptable using Option 1, and is consistent with the requirements of this GOP, R&M assigns an approval number to the load (e.g., R&M # 01032) that is unique to the customer/contractor and project. This number will be used to identify the shingles if additional materials from the same source or project are received at the facility. Any materials that will be qualified for acceptance using Option 2 will be assigned a conditional approval number (e.g., C-01034) which indicates that final acceptance is contingent upon the results of pre-acceptance sampling. For each shipment of shingles that arrives at the facility, a facility operator will complete Daily Receipt Log (see Attachment II) which will include the R&M approval code assigned to the shipment.

4.2 Acceptance Procedures

Sources of asphalt shingles, that have been reviewed and approved for the R&M facility using the pre-qualification procedures specified in Option 1 as outlined in Section 4.1 above, may be accepted by the facility for storage and processing. Once an approval number is issued for the shingles, any shingles from that same project and supplier may be accepted at the facility. For each shipment of shingles that arrives at the facility, a facility operator will complete Daily Receipt Log (see Attachment II) which will include the R&M approval code assigned to the shipment. Any post-consumer shingles that have been conditionally approved (i.e., they have been assigned a conditional approval number) using Option 2 must be sampled and tested by R&M prior to final acceptance. All samples will be collected by a State of Delaware Asbestos Field Technician employed by a Licensed State of Delaware Professional Service Firm. Incoming shipments of these post-consumer shingles that will be tested will be placed in small segregated stockpiles within the Unprocessed Material Storage Area for pre-acceptance testing. Each stockpile will be generally limited to approximately 50 cubic yards in size to facilitate the sample collection. Larger stockpiles may be used (not to exceed 150 cubic yards each); however, the sampling frequency will be increased as outline below. More than one supplier's

material (i.e., more than one conditional approval code) may be placed in the same pre-acceptance stockpile for sampling. However, the sample results obtained will only be used to qualify the stockpile sampled. Additional shipments from the same supplier must continue to be stockpiled and sampled as described below regardless of the results of the prior stockpile.

The following pre-acceptance sample collection and analysis procedures will be followed by R&M:

- 1) For stockpiles of asphalt shingles individual grab samples should be randomly collected from different locations of the pile. The individual grab samples may be combined into a composite sample (no more than 3 grabs per composite) for final analysis. The minimum number of samples required is as follows:

<u>Stockpile Quantity</u>	<u>No. of Grabs/No. of Composites</u>
0 – 50 cy	6 grabs/2 composites
51 – 100 cy	9 grabs/3composites
101 – 150 cy	12 grabs/4composites

- 2) When sampling a stockpile, grab samples should be collected from points of the pile with the greatest potential based on visual inspection, to contain ACM (i.e., materials of fibrous nature, material resembling or attached to ACM related material, etc.)
- 3) Other roofing materials, such as wood or metal waste, do not require additional testing for asbestos.
- 4) If any unexpected observations are noted during sampling (e.g., unusual stains, or odors, materials, etc.) the Facility Manager will be notified to determine if additional sampling is required or if the materials must be rejected.
- 5) Samples are to be analyzed using a polarized light microscopy (PLM) EPA test method 600/R-93-116, or equivalent method approved by the Agency. Testing should be completed by an accredited laboratory registered under National Voluntary Laboratory Accredited Laboratory Program, (NVLAP).

Upon receipt of the laboratory analysis, R&M will review the results to ensure that the materials received are not classified as ACM, as defined in 40 CFR Part 61 Subpart M. Any shingles that have been tested to show that the material is not ACM may be

comingled and mixed in the Unprocessed Material Storage Area to await further processing. If the laboratory analysis shows that the material is classified as ACM, the entire stockpile will be handled as ACM shingles. R&M will notify the Department and either arrange for proper disposal of the material or reject the material back to the original supplier. Upon the Department approval, R&M may conduct additional sampling of the stockpile to further segregate or separate out the ACM shingles. Again, any additional samples will be collected by a State of Delaware Asbestos Field Technician as specified above.

4.3 Pre-Acceptance Inspections

Inbound trucks are visually inspected by a facility operator to confirm that the contents are consistent with the pre-approval information and are acceptable to the facility. Shipments that have a high percentage (10% or greater by weight) of unprocessable materials, such as wood, metal, flashing, etc., which cannot be easily removed during the sorting/separation process may not be accepted at the facility. In addition, any unacceptable materials identified during this inspection, i.e., Asbestos-Containing Material (ACM), fiber glass and other insulation materials, liquid materials (e.g., paints, oils, roofing tars, etc.), floor tiles, siding or other C&D materials not related to roof repair and/or replacement or related demolition activities, may either be segregated and rejected back to the supplier, in certain cases, the entire shipment may be rejected.

4.4 Rejection Procedures

If the visual inspection indicates that the vehicle's contents, or a portion of the contents, are not acceptable it will be directed to a holding area. R&M will subsequently contact the supplier and describe the reasoning for the rejection of the shipment, or any portion thereof. The vehicle's driver will be directed to return the rejected materials to the supplier for further action. Any rejected materials will be noted on the Daily Receipt Log.

5.0 Facility Inspection and Maintenance Procedures

Should a material hauler's vehicle break down while onsite, it will be the responsibility of the hauling company to repair their own equipment or dispatch an outside service company to R&M to repair the broken equipment. The R&M facility cannot assist in helping to repair outside material hauler's vehicles or equipment.

6.0 Facility Personnel and Training Requirements

6.1 Facility Personnel

Staffing at the R&M recycling facility consists of the Facility Operations Manager and several support personnel including equipment operators and general laborers. The Facility Operations Manager will be responsible for all facility operations; oversight of facility employees; ensuring compliance with applicable operating permits, regulations and the requirements specified in this GOP; completing the daily facility inspections; oversight of health and safety; scheduling of inbound/outbound loads; and acting as the primary coordinator during emergencies.

6.2 Personnel Training

All recycling facility employees will have job specific training provided by R&M. In addition to job specific training, employees may be required to receive specific OSHA required training to comply with applicable federal standards. Facility personnel will receive both initial training and annual training, thereafter, in the following areas:

- Facility Procedures for Material Acceptance, Handling, Inspections and Recordkeeping;
- Contingency Plan and Emergency Response Procedures training;
- Use of General Health and Safety Procedures including, 1) Use of Personal Protective Equipment in accordance to 29 CFR 1910.132, 2) First Aid Awareness, 3) Fire Prevention, and 4) Equipment Operations (consistent with the manufacturer's recommendations).

In addition, R&M will designate "Competent Persons" who are required to visually inspect all incoming materials for the potential presence of ACM. These Competent Persons must be trained in accordance with the applicable requirements specified by OSHA, under 29 CFR 1926.1101(o) (4) (ii), or USEPA under 40 CFR 763.92(a) (2).

7.0 Contingency Plan and Emergency Response Procedures

On a day to day basis, facility employees should always be on alert for potential emergency situations that could affect, or have the potential to affect, human health and the environment. The emergency response and contingency procedures that must be implemented in the event of a fire, spill or explosion at the facility are outlined in the facility's Contingency Plan. A copy of the Contingency Plan is provided as Attachment III.

8.0 Recordkeeping Procedures

8.1 Facility Operating Records

Copies of the following records and forms will be returned by the Facility Operations Manager to document compliance with the operating requirements specified in the GOP.

- Completed Pre-Approval/Certification Forms and related documents (sample results provided by suppliers, documentation of shingle source information/age, etc.);
- Records of any sampling or testing completed of incoming post-consumer shingles by R&M;
- Daily Receipt Logs for incoming shipments;
- Records of shipments of the finished products to end users.

8.2 Inspection Documents

Periodic facility inspections are documented immediately after the inspection using the Facility Inspection Report, as described in Section 5.0 above. Copies of the Facility Inspection Report Form must be maintained onsite by the Facility Operations Manager.

8.3 Incident Reports

Incidents requiring emergency response actions or initiation of the facility's Contingency Plan are documented using an Incident Report Form (a sample is included in Attachment II) immediately following the incident. Copies of the Incident Report Form are maintained by the Facility Operations Manager. A typical Incident Report Form will include: time/date, inspector's name, type of incident, description of the incident, details on the release (if applicable), corrective action implemented, notifications made including feedback from the notified agencies, detailed information on the injured person (if applicable), etc.

8.4 Reporting to the State of Delaware

8.4.1 Quarterly Reports

Quarterly reports will be submitted in electronic format, or as prescribed by the Department. The first Quarterly reports will be due 15 days after the end of the calendar quarter (i.e., April 15th, July 15th, October 15th and January 15th).

- The amount of shingles accepted at the site for the quarter.
- The amount of shingles processed for the quarter.
- The amount of unprocessed shingles stored onsite at the end of the quarter.
- The amount of shingles stored onsite at the end of the quarter.
- A list of any shipments rejected and the purpose for rejection.
- A list of any sampling done by R&M when ACM was found and when the ACM was disposed.

The quarterly report shall be e-mailed to the following individuals:

Mindy Anthony

Mindy.Anthony@state.de.us

8.4.2 Annual Reports

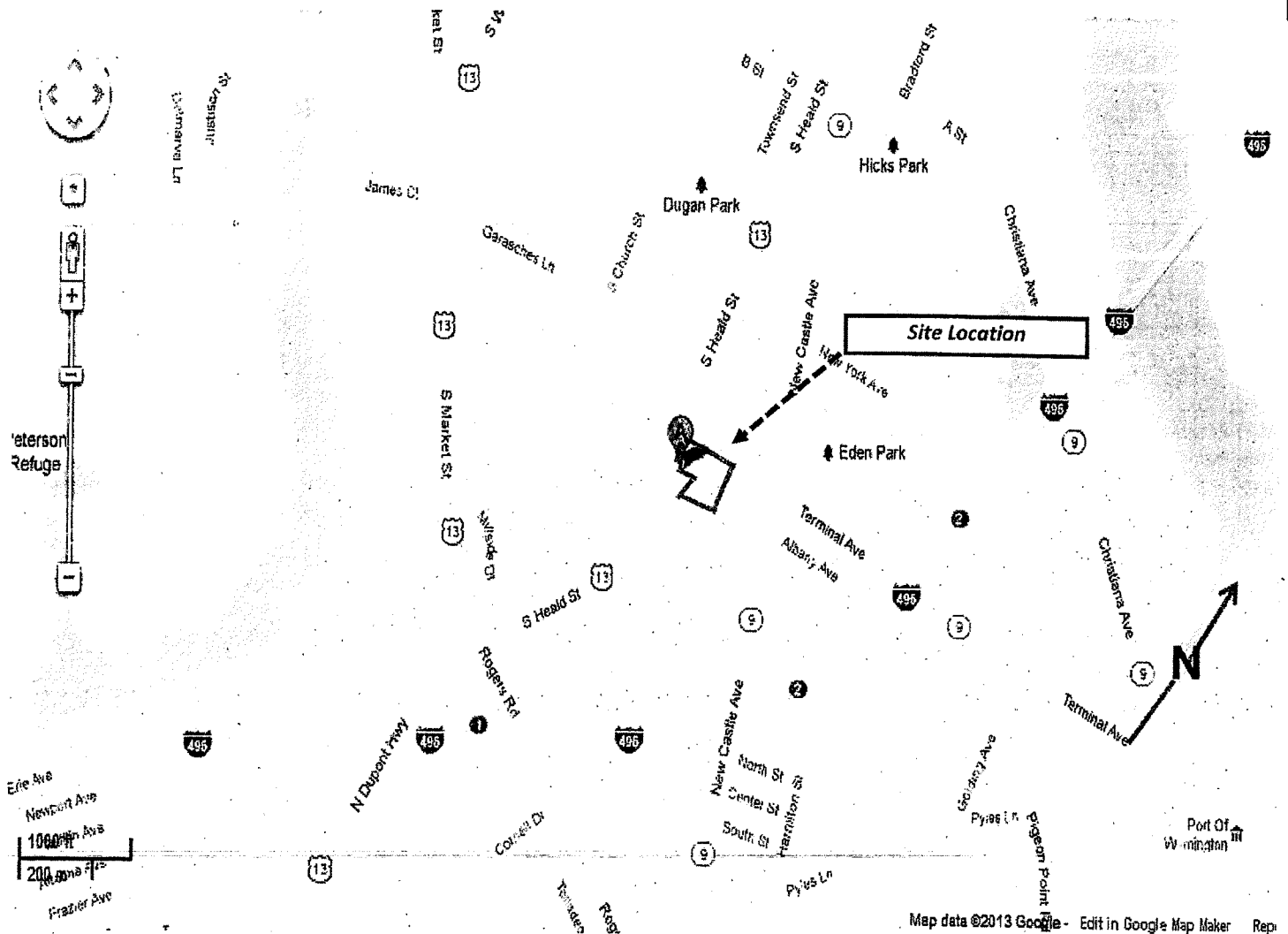
Annual Reports will be submitted in hard copy (paper) format. The annual report will consist of a summary of all the information included in the quarterly reports. Annual reports will be due no later than February 1st of each calendar year. In addition, R&M must submit an updated closure cost estimate that has been adjusted for inflation. Any increase in closure cost will require the submission of a new financial assurance within six (6) weeks of filing the adjusted closure costs. The annual report shall be sent to the following address:

Mindy Anthony
DNREC – SHWMS
89 Kings Hwy
Dover, DE 19901

Attachment I

Site Plans and Drawings

SITE LOCATION MAP
R&M Recycling, LLC
924 Heald Street
Wilmington, Delaware 19801



Map data ©2013 Google - Edit in Google Map Maker Rep

Source of Aerial: Microsoft Streets & Trips

SITE LOCATION MAP
R&M Recycling, LLC
924 Heald Street
Wilmington, Delaware 19801

Scale: None

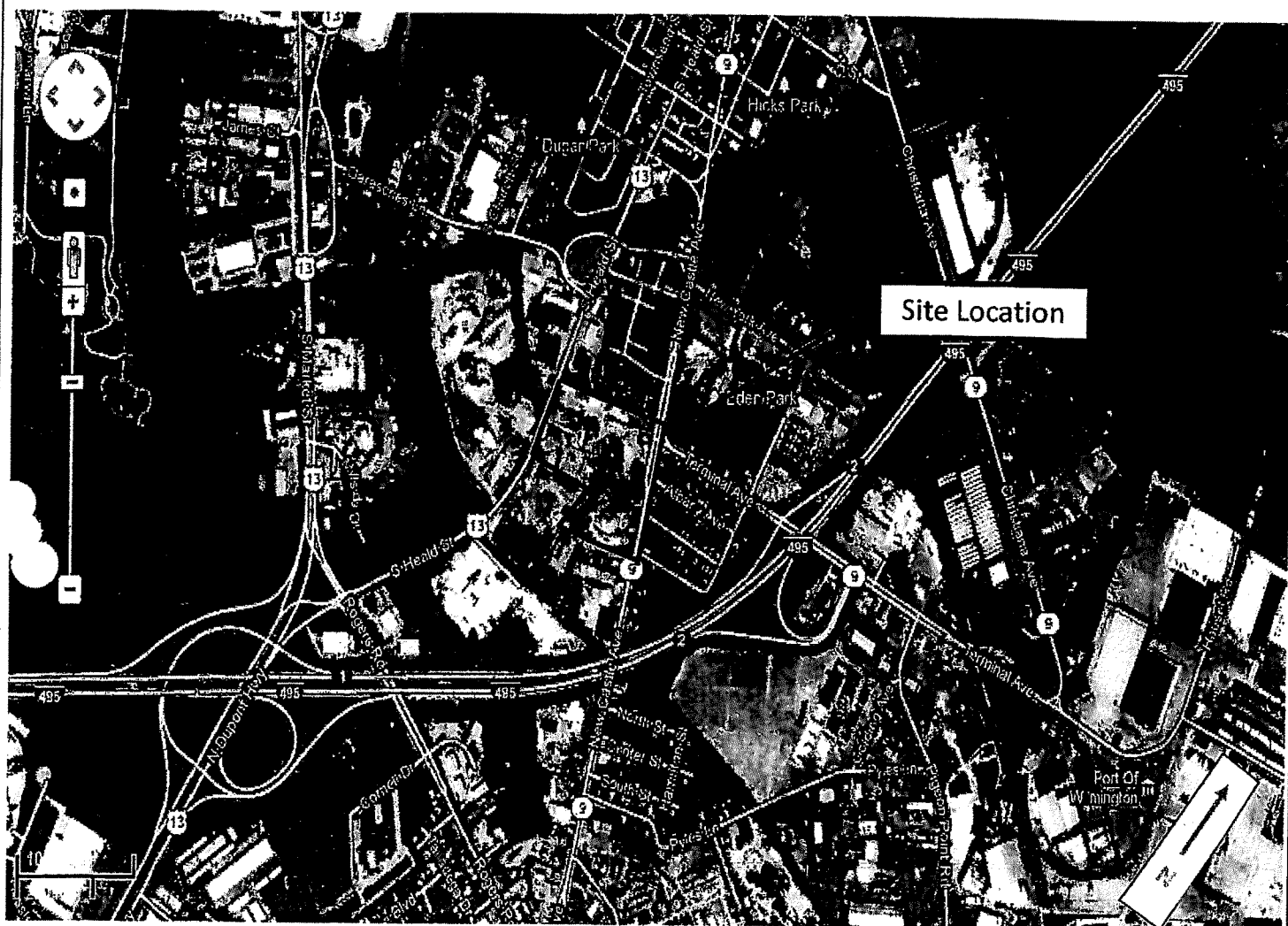
Date: March - 2013

Project No. 0309.0312.01

Project Name: R&M Recycling, LLC

Compliance Plus Services
P.O. Box 186
Hatboro, PA 19040
Phone: (215)734-1414 * Fax: (215)734-1424

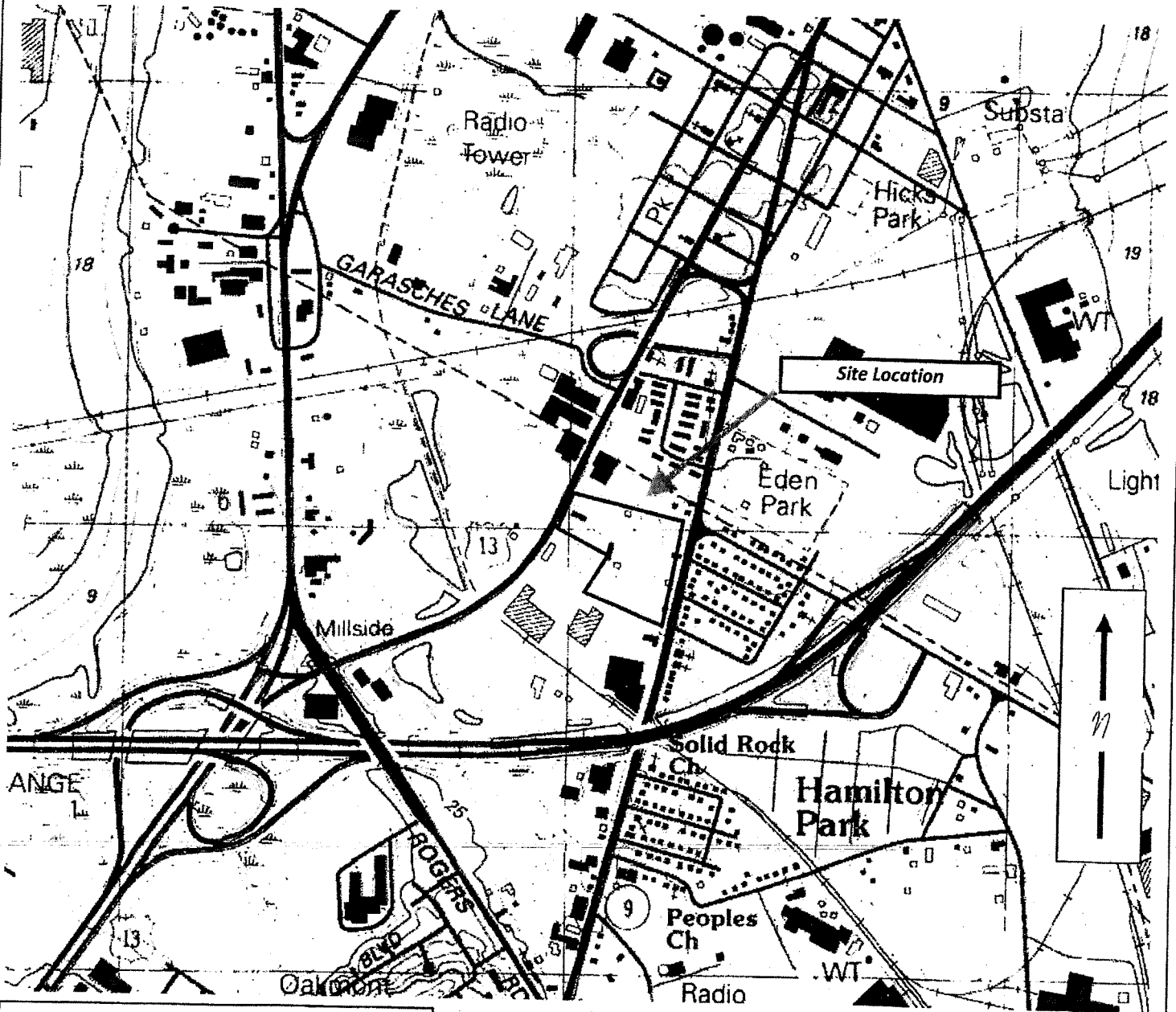
AERIAL LOCATION MAP
R&M Recycling, LLC
924 Heald Street
Wilmington, Delaware 19801



AERIAL LOCATION MAP R&M Recycling, LLC 924 Heald Street Wilmington, Delaware 19801	Scale: None	Date: March 2013
	Project No. 0309.0312.01	Project Name: R&M Recycling, LLC

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Hatboro, PA 19040
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TOPOGRAPHIC MAP
R&M Recycling, LLC
924 Heald Street
Wilmington, Delaware 19801



Map Source: <http://topomaps.usgs.gov/>

TOPOGRAPHIC MAP

R&M Recycling, LLC
 924 Heald Street
 Wilmington, Delaware 19801

Scale: None

Date: March - 2013

Project No. 0309.0312.01

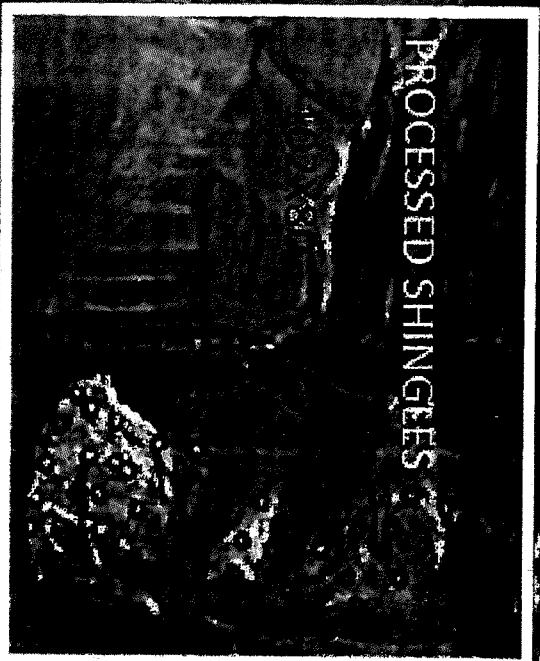
Project Name: R&M Recycling, LLC

Compliance Plus Services

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Hatboro, PA 19040

Phone: (215)734-1414 * Fax: (215)734-1424



PROCESSED SHINGLES

GRINDER

UNPROCESSED TESTED
SHINGLES

SHINGLE HOLDING AREA
AWAITING TESTING



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Conversion Ratios

CONVERSION RATIOS

UNPROCESSED MATERIALS

MATERIAL	TONS : CUBIC YARDS	CUBIC YARDS : TONS
ASPHALT, CONCRETE, BRICK AND BLOCK	1 TON = 0.83 CY	1 CY = 1.2 TONS
ASPHALT BASED ROOFING SCRAP	1 TON = 2 CY	1 CY = 0.5 TONS
STUMPS/LOGS	1 TON = 4 CY	1 CY = 0.25 TONS
BRUSH	1 TON = 8 CY	1 CY = 0.125 TONS
WOOD PALLETS	1 TON = 7 CY	1 CY = 0.143 TONS
WOOD (OTHER)	1 TON = 5.5 CY	1 CY = 0.182 TONS
SOIL	1 TON = .769 CY	1 CY = 1.3 TONS
CAR TIRES	1 TON = 10 CY	1 CY = 0.1 TONS
CAR TIRES	1 TON = 100 TIRES	1 TIRE = 20 LBS.
TRUCK TIRES	1 TON = 22.22 TIRES	1 TIRE = 90 LBS.
LEAVES COMPACTED	1 TON = 2 CY	1 CY = 0.5 TONS
LEAVES UNCOMPACTED	1 TON = 5 CY	1 CY = 0.2 TONS
LEAVES VACUUMED	1 TON = 2.86 CY	1 CY = 0.35 TONS
LEAVES BAGGED	1 BAG = 15 LBS.	
GRASS COMPACTED	1 TON = 1.8 CY	1 CY = 0.556 TONS
GRASS UNCOMPACTED	1 TON = 2.7 CY	1 CY = 0.37 TONS

PROCESSED MATERIALS

MATERIAL	TONS : CUBIC YARDS	CUBIC YARDS : TONS
CRUSHED CONCRETE	1 TON = 0.667 CY	1 CY = 1.5 TONS
ROOT MULCH (STUMPS) [MOIST]	1 TON = 2.5 CY	1 CY = 0.4 TONS
HARDWOOD MULCH (TREE PARTS)	1 TON = 3 CY	1 CY = 0.333 TONS
WOOD CHIPS	1 TON = 4 CY	1 CY = 0.25 TONS
WOOD CHIPS (PALLETS) [DRY]	1 TON = 6.5 CY	1 CY = 0.154 TONS

Storage Volume Calculations

Storage Volume Calculations

Rd M Recycling, LLC

Page (3) of (4)

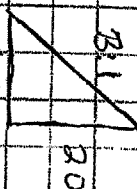
$$\text{Storage Capacity} = \text{Volume} - \text{Slope Factor}$$

Assumptions:

$$\text{Max Height} = 20 \text{ ft}$$

$$\text{Max Slope} = 3:1$$

$$\text{Slope Factor} = 66.7 \text{ CF/LE}$$



$$\frac{1}{2}(20)(66.7) = 66.7 \text{ CF/LE}$$

$$\text{VOL}_{\text{Processed Material Stockpile}} = \text{VOL}_{\text{area}} - \text{Slope Factor}$$

$$= (\text{SF of Footprint} \times \text{Height}) - (66.7 \times \text{Perimeter})$$

$$= [(87' \times 40' + \frac{1}{2}(87' \times 20')) \times 20] - [(66.7 \times (87' + 65' + 91' + 40'))]$$

$$= [(4741.5) \times (20)] - [(66.7) \times (287)]$$

$$94830 - 19142.9$$

$$= 75687.1 \text{ CF}$$

$$= 2803.23 \text{ CY}$$

$$2803.23 \text{ CY} \times \frac{1000}{2 \text{ CY}} = 401.62 \text{ TONS} > 1000 \text{ TONS}$$

There is sufficient room in this area to store the maximum permitted amount of 1000 tons of processed material

$$VOL_{unprocessed\ material} = Vol_{area} - Slope\ Factor$$

Assuming Testing

$$= (SE\ of\ Footprint \times Height) - (66.7 \times Perimeter)$$

For 35ft Height

$$VOL = (4222 \times 35) - (66.7 \times 283)$$

$$= (147770 - 18876) CF = 128894 CF$$

$$= 2387\ tons$$

NOTE: AREA OF FOOTPRINT AND PERIMETER MEASUREMENT BASED ON CAD PROGRAM MEASUREMENTS OF Aerial SCALE MAP

$$\textcircled{2} \text{ Assume } 2\ CY\ of\ material = 1\ TON$$

VOL

Tested Unprocessed Material = Vol area - Slope Factor

$$= (SF \text{ of Footprint} \times \text{Height}) - (66.7 \times \text{Perimeter})$$

For 35ft Height

$$\text{Vol} = [(10046 \times 35) - (66.7 \times 419)] \text{ CF}$$

$$= (351610 - 27961.3) \text{ CF} = 118649 \text{ CF}$$

$$= 5932 \text{ TONS}$$

NOTES: ① AREA OF FOOTPRINT AND PERIMETER MEASUREMENTS BASED ON CAD PROGRAM MEASUREMENTS OF AERIAL SCALE MAP

② Assume 2 CY OF MATERIAL = 1 TON

$$(2387 + 5932) \text{ TONS} = 8319 \text{ TONS} > 8000 \text{ TONS}$$

There is sufficient room in the two unprocessed material storage areas to store the maximum permitted amount of 8000 TONS

Prepared By: GRASIDLEY CUNNINGHAM

Compliance Plus Services, Inc.

PROJECT: R & M Recycling, LLC

REVISION:

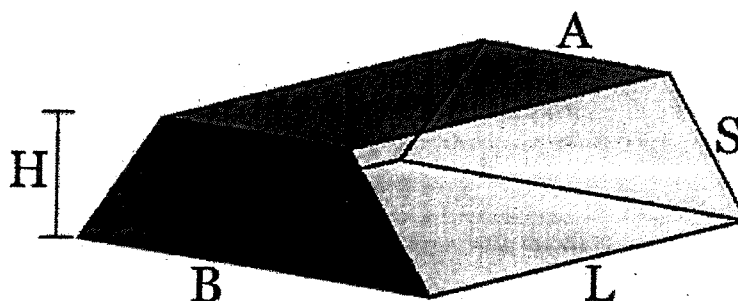
DATE: March 2013

Tested Unprocessed in Field

Volume Calculation

Volume of a Trapezoidal Prism: Formula and Examples

Updated on February 5, 2015



In geometry, a trapezoidal prism is a solid shape that has trapezium (trapezoid) cross-sections in one direction and rectangular cross-sections in the other directions. When computing the volume of a symmetric trapezoidal prism, you need to know four measurements: the length of the prism (L), the height of the trapezoidal cross-section (H), the base width of the trapezoid (B), and the top width of the trapezoid (A).

Alternatively, if you know the trapezoid's slant side lengths (S), you can compute the volume with L , S , B , and A .

Both formulas for the volume of a trapezoidal pyramid are given below along with several example problems. See also, [Surface Area Formula for a Trapezoidal Prism](#).

Formula for Volume of a Trapezoidal Prism

If the prism length is L , trapezoid base width B , trapezoid top width A , and trapezoid height H , then the volume of the prism is given by the four-variable formula

$$V(L, B, A, H) = LH(A+B)/2.$$

In other words, multiply together the length, height, and average of A and B . This formula is equivalent to multiplying the length of the prism by the area of the trapezoidal cross-sections. If you don't know H , but instead know the slant side length S , the formula is a bit more complicated. It's

$$V(L, B, A, S) = L(A+B)\sqrt{4S^2 + 2AB - B^2 - A^2}/4.$$

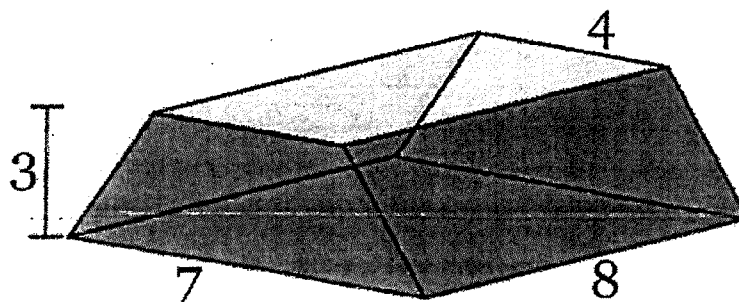
This second formula is derived from the fact that

$$\begin{aligned} H &= \sqrt{S^2 - ((B-A)/2)^2} \\ &= \sqrt{4S^2 + 2AB - B^2 - A^2}/2. \end{aligned}$$

Here are some example problems to help you work out prism volumes. In the formulas above and examples below, it is assumed that the trapeziums are symmetric, that is, the slant side lengths are equal on both sides; the center of the top length is vertically aligned with the center of the base length.

Example 1

A trapezoidal prism has a length of 8, base width of 7, top width of 4, and height of 3.



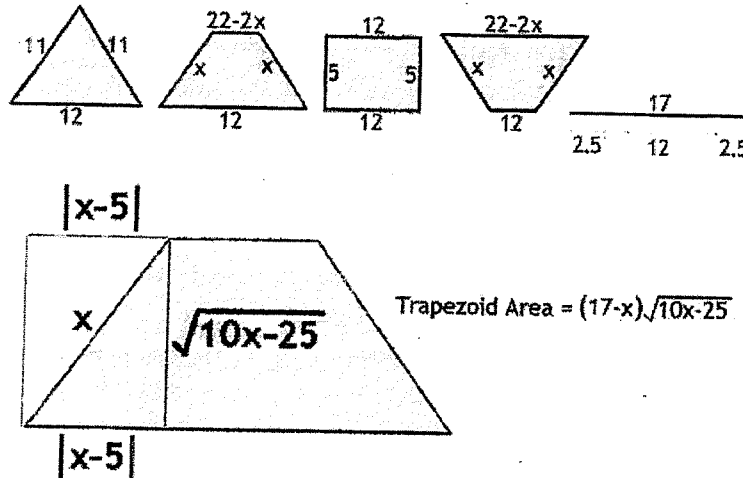
7/28/2015

Volume of a Trapezoidal Prism: Formula and Examples

A box in the shape of a trapezoidal prism is to be made, subject to the following three conditions: the length of the prism box is 24 cm, one of the parallel sides of the trapezoid face has a length of 12 cm, and the whole perimeter of the trapezoidal face is 34 cm. What shape should the trapezium be so that the volume of the box is maximized?

To begin, we should note that this is essentially a problem in maximizing the area of the trapezoid since the lengths of all the possible trapezoidal prisms will be equal to 24 cm.

To create the equations we need to solve, let x equal the length of each slant side and $34 - 12 - x - x = 22 - 2x$ be the length of the other parallel side. Below are the possible trapezoid shapes that fit the constraints of the problem; the triangle and flat line are the limiting cases.



Regardless of the shape of the trapezoid, its height can be found by applying the Pythagorean Theorem to the right triangle formed on the trapezoid's side. Simplifying the expression

$$h^2 + |x-5|^2 = x^2$$

gives us $h = \sqrt{10x-25}$. See figure above. Since the area of a trapezoid is $1/2$ times height times the sum of the two parallel side lengths, we have

$$\text{Area} = (1/2) \cdot \sqrt{10x-25} \cdot (34-2x) = (17-x) \cdot \sqrt{10x-25}.$$

since the sum of the two parallel sides is the perimeter (34) minus the sum of the two slant sides ($2x$). To maximize the area, we take the derivative of the function, set it equal to zero, and solve for x . Using the product rule, the derivative is

$$[(17-x) \cdot \sqrt{10x-25}]' = (110x-15)/\sqrt{10x-25}$$

This derivative equals 0 when $x = 110/15 = 22/3$, or about 7.33333. Plugging this value into the area function gives us a maximum trapezoidal area of

$$(17 - 22/3) \cdot \sqrt{220/3 - 25} = (29/3) \cdot \sqrt{145/3} \approx 67.20477 \text{ cm}^2$$

The maximum volume of the trapezoidal prism is then $24 \cdot (29/3) \cdot \sqrt{145/3} \approx 1612.91455 \text{ cm}^3$. The solution prism is shown below.

